



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/524,912	05/27/2005	Frederick John Currell	MUR07-GN002	5670
30074 7590 05/31/2007 TAFT, STETTINIUS & HOLLISTER LLP SUITE 1800 425 WALNUT STREET CINCINNATI, OH 45202-3957			EXAMINER JOHNSTON, PHILLIP A	
			ART UNIT 2881	PAPER NUMBER
			MAIL DATE 05/31/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/524,912

Applicant(s)

CURRELL, FREDERICK JOHN

Examiner

Phillip A. Johnston

Art Unit

2881

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 February 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-96 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-96 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 May 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 5-2005; 7-2005.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

Detailed Action

1. This Office Action is submitted in response to the preliminary amendment filed 2-17-2005, wherein claims 1-96 are pending.

Claims Rejection – 35 U.S.C. 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 16 and 64 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contain subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Particular subject matter contained in claims 16 and 64 includes the limitation “wherein the frequency of alternating current voltage applied to the circular electrode is of a frequency having a period that is less than the time taken for light to pass over the diameter of the circular electrode.”

This limitation is unclear and ambiguous, since applicant's disclosure does not provide any additional description of the light nor its passage over the electrode. As a result it is the examiners contention that the specification does not contain clear, concise, and exact terms that would enable any person skilled in the art to make and use the now claimed invention.

Claims Rejection - 35 U.S. C. 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-11,13,16-22,24-29,41-43,45-59,61,64-70,75-77,80-87,89-91, and 93-96 are rejected under 35 U.S.C. 102 (b) as being anticipated by Whitehouse, U.S. Patent No. 6, 683,301.

6. The examiner has assumed for purposes of this examination that the limitation "manipulation of phase space" as recited in claims 1 and 49 is defined in applicant's specification at paragraphs [0011] and [0012], as a region of phase space manipulation is provided for constraining and restraining a particles motion on one side of an electrode.

7. Regarding claim 1, Whitehouse teaches a time-of-flight mass analyzer 1 (see Figure 1D below) having an orthogonal pulsing region 10 that includes pusher electrode 11, where ions having the spatial and velocity distribution (phase space) of the original beam, are gated into the potential well generated in pulsing region 10, which has been created in the space immediately proximate to surface of electrode 11 (one electrode arranged on a surface), where once inside the potential well the ions are constrained and accumulated

(manipulated) over time prior to acceleration into the Time-Of-Flight tube for mass analysis. See Abstract, Col. 18, line 50-67; and Col. 20, line 5-55.

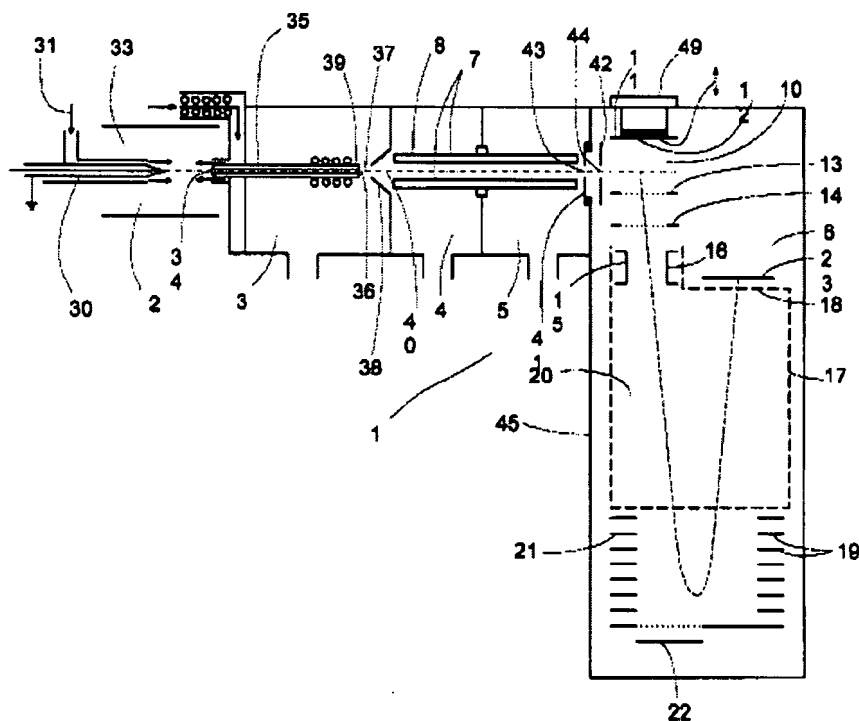


Figure 1D

Whitehouse also teaches that the potential well is created in pulsing region 10 (a region of phase space manipulation) due to the repelling effect of a high-frequency AC electric field that is created in the space and a static DC electric field that accelerates ions toward the surface. Col. 18, line 17-32.

Whitehouse further teaches the initial ion trajectory in the pulsing region is directed such that any orthogonal component of velocity would be correlated to the ion spatial location (phase space). Col. 21, line 25-50.

8. Regarding claim 49, the rational applied above to claim 1, also applies to the structural limitations of claim 49.

9. Regarding claims 2,3,50 and 51, Whitehouse teaches that the pulsing region and Time-Of-Flight drift region have different vacuum pumping systems to maintain their required vacuum pressures. The pressure in pulsing region 10 can be adjusted by using a pulsed gas inlet valve. Col. 33, line 13-39.

10. Regarding claims 4-6,24,27,52-54,61,63, Whitehouse teaches varying the timing and application of voltages to the electrodes, which is controlled by the configuration of power supplies, switches and controllers, and providing adjustable RF and DC power supplies. Col. 23, line 29-46; and Col. 24, line 6-18.

11. Regarding claims 7,8,55,56,89, and 90, the rational applied above to claims 1 and 49, also applies to claims 7,8,55,56,89, and 90, wherein Whitehouse teaches that once inside the potential well the ions are constrained (guided) and accumulated (trapped) over time prior to acceleration into the Time-Of-Flight tube for mass analysis.

12. Regarding claims 9-11, and 57-59, Whitehouse teaches that electrode surface 90 is formed by an array of separate electrodes, an array of wire tips 88, where the wires are oriented perpendicular to the surface (Note FIG. 5A below). Col. 9, line40-50; and Col. 23, line 50-65.

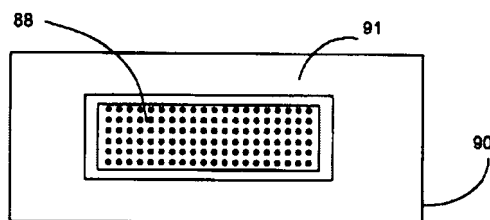


Figure 5A

13. Regarding claims 17-19,21,22, 24-29, 65-67,69,70,75-77,80-86,89 Whitehouse teaches manipulating particles by varying trapping regions due to application of voltages selectively to individual segments of the array, where manipulating includes moving particles perpendicularly in the potential well, and moving particles (distinguishing) in proportion to their m/z value. Col. 9, line 60-66; and Col. 11, line 45-55.

14. Regarding claims 41-43,45-48,87,89-91, and 93-96, Whitehouse teaches planar electrode 13 (note Figure 1A below) forms the boundary opposite pusher electrode 11 of pulsing region 10, which contains an aperture or hole for extracting (moving) ions into the TOF drift region. Col. 17, line 18-51.

Claims Rejection – 35 U.S.C. 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

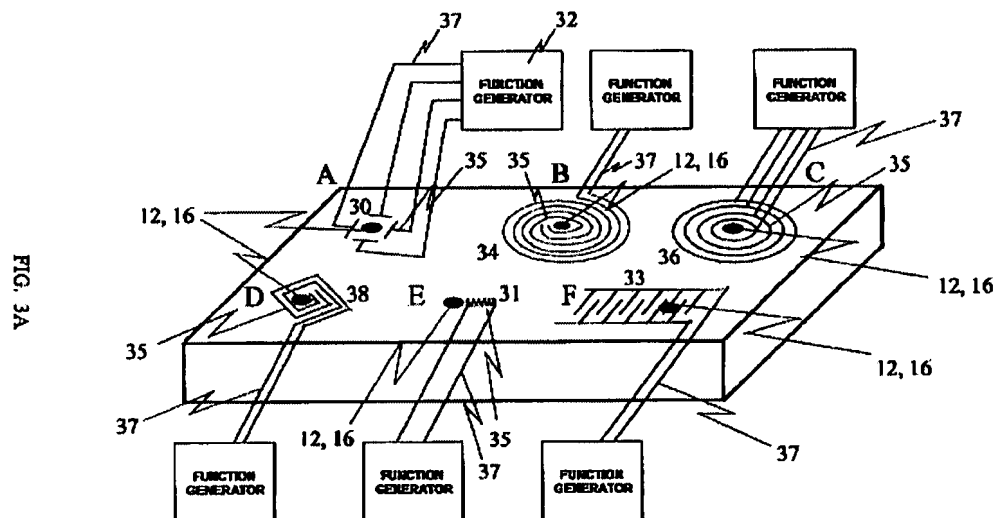
16. Claims 12,14,15,23,30-40,44,60,62,63,71-74,78,79,88, and 92 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,565,314 to Whitehouse, in view of Wang, U.S. Patent Pub. No. 20020182627.

17. Regarding claims 12 and 60, Whitehouse teaches that one skilled in the art would recognize that variations in RF electrode configurations for generating RF-fields above surfaces, and pulsing region geometries fall within the scope of the invention, therefore one of ordinary skill would recognize that the Whitehouse electrode configurations would include a hemispherical electrode array. Col. 34, line 65-67; and Col. 35, line 1-3.

18. Regarding claims 14,23,30,32-39,62,71-74, and 78, Whitehouse teaches all the required limitations therein, as pointed out with respect to claims 1 and 49 above.

19. Whitehouse fails to teach the use of plural concentric circular electrodes having an aperture.

20. Wang teaches a quadropole electrode structure (note Figure 3A -3C below) wherein FIG. 3B depicts a spiral electrode structure 34, circular in nature, that is useful for positioning particles 35 at or near a hole 12, 16 (aperture) and FIG. 3C depicts a concentric electrode structure 36, circular in nature, that is useful for positioning particles 35 at or near a hole 12, 16 wherein the depicted electrical connection leads 37 are operably engaged with an electrical signal source 32. See [0037] to [0041].



21. Wang modifies Whitehouse to provide particle positioning means where electrical connection leads (37) are operably connected with an electrical signal source (32), such as a sine wave generator, to allow modulation of current at the electrode structures to allow positioning of particles.

22. Therefore it would have been obvious to one of ordinary skill in the art that the alignment apparatus and process of Whitehouse can be modified to use the electrode structures of Wang, to provide miniaturized devices for modulating ion transport functions or properties.

23. Regarding claims 15 and 63, the rationale applied above to claims 4-6, 24, 27, 52-54, 61, and 63, also applies to claims 15 and 63, particularly the use of a ground (earthed) potential.

24. Regarding claims 31, 40, 44, 79, 88, and 92, Whitehouse teaches that different pumping stages are used, one to maintain the pressure in the TOF drift tube, and

another to provide a pressure of 1×10^{-5} torr in the pulsing region, which is maintainable when gas is introduced into the pulsing region due to the aperture between them (differential pumping), and it is well known in the art to provide adiabatic cooling due to the differential pressure on each side of an aperture (See USPN 5,015,845 to Allen), where the flow through can be sonic, subsonic or supersonic based upon the size of the aperture. Therefore it would have been obvious for Whitehouse to select an extraction aperture size to provide cooling of particles.

Conclusion

25. Any inquiry concerning this communication or earlier communications should be directed to Phillip Johnston whose telephone number is (571) 272-2475. The examiner can normally be reached on Monday-Friday from 7:30 am to 4:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiners supervisor Robert Kim can be reached at (571)272-2293. The fax phone number for the organization where the application or proceeding is assigned is 571 273 8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

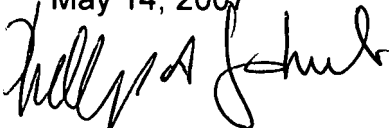
Application/Control Number: 10/524,912
Art Unit: 2881

Page 10

you have questions on access to the Private PAIR system, contact the Electronic
Business Center (EBC) at 866-217-9197 (toll-free).

PJ

May 14, 2007


5-14-2007